REMARKS/ ARGUMENTS

The Office Action of February 2, 2005 has been carefully reviewed and this response addresses the Examiner's concerns.

Status of the Claims

Claims 1-21 were pending in the application.

Claims 1, 8 and 14 are amended in order to more clearly express the invention.

Claim 2 was canceled without prejudice.

Claims 1, 3-13, 18 and 21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Bouevitch (U.S. Patent Publication No. US2003/0021526).

Claims 14-17 and 19-20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Bouevitch (U.S. Patent Publication No. US2003/0021526) in view of Shirasaki et al. (U.S. Patent Publication No. US2002/0114090).

Support in the specification for the amendments

Amended claims 1, 8 and 14 include the phrase "wherein, in order to provide said pre-selected relationship, said holographic mirror has reflection properties different from a conventional mirror," in order to more clearly express the invention. In Figures 1 through 4 of the present application, the Applicants show holographic mirrors in which the angle of reflection is the negative of the angle of incidence, which is the opposite of a conventional mirror where the angle of reflection is equal to the angle of incidence (see, for example, any textbook in optics such as E. Hetch, *Optics*, ISBN 0-201-11609-X, pp. 83 and 154). Holographic mirrors are described in col. 6, lines 13-23 of US Patent # 6,072,923, which is incorporated by reference in the specification.

The 35 U.S.C. §103 rejections

Claims1, 3-13, 18 and 21 were rejected under 35 U.S.C. §102(a) as being unpatentable over Bouevitch (U.S. Patent Publication No. US2003/0021526).

In order to illustrate the patentable differences between the Applicant's invention and Bouevitch, the following description of the applicant's invention is provided. In the applicant's invention, holographic mirrors having reflection properties different from a conventional mirror are utilized to provide, through reflecting the chromatic components from the holographic mirror, a pre-selected relationship between the optical path lengths of the distinct chromatic components, where the pre-selected relationship substantially compensates chromatic dispersion. In Figures 1 through 4 of the present application, the holographic mirrors exhibit an angle of reflection is the negative of the angle of incidence, which is the opposite of a conventional mirror where the angle of reflection is equal to the angle of incidence. In a conventional mirror, the relationship between the angle of reflection and the angle of incidence, the reflective property, can not be changed or preselected; it is always the same, the angle of reflection equals the angle of incidence. Thus, conventional mirrors could not have been used to preselect the relationship between the optical path lengths of different chromatic components in the applicant's invention and the use of conventional mirrors would render the invention described in Figures 1 through 4 inoperable.

There are significant differences between conventional mirrors and holographic mirrors and that those differences enable the compensation of chromatic dispersion taught in the present application. A conventional mirror obeys the law of reflection, i.e., the angle of incidence equals the angle of reflection. Because of that fixed relationship, conventional mirrors must be positioned normal (perpendicular) to a beam to retro-reflect the beam back into the system. A holographic mirror, however, has an extra degree of freedom, whereby the angle of reflection can be set (during fabrication) independently from the angle of incidence. This is accomplished by tilting the element during holographic exposure as shown in US Patent # 5,692,077 (col. 13, lines 17-23), which is incorporated

by reference in the present application. (See also U.S. patent 5,771,320, col. 8, lines 40-48 for other fabrication details.) In effect, this tilting during exposure provides for orienting the Bragg planes in the volume mirror independently form the surface normal direction, providing the above referenced additional degree of freedom. A variety of these more general holographic mirrors are described in detail in US Patent # 6,072,923, also incorporated by reference in the present application (for holographic mirrors, such as those as used in the present patent application, see col. 6, lines 13-23). These holographic mirrors can enable operations that are not possible with conventional mirrors, such as the chromatic compensation in the present patent application. Applicant respectfully asserts that holographic mirrors such as those claimed in the Applicant's invention do not perform the same function as conventional mirrors, nor do they behave in the same way as conventional mirrors and obtain different results from those obtained by using conventional mirrors.

In contrast, Bouevitch discloses the use of conventional mirrors, such as MEMS mirrors or the mirrors shown in Figures 6a and 7-9. Therefore, Bouevitch does not teach the use of holographic mirrors having reflection properties different from a conventional mirror,

Furthermore, Applicant respectfully asserts that there is no motivation to modify Bouevitch by replacing the conventional mirrors with holographic mirrors having reflection properties different from a conventional mirror since that replacement would render the Bouevitch invention inoperable. Consider, for example, the system shown in Figures 6a and 7-9 of Bouevitch. In any of those systems, if the angle of incidence is not equal to the angle of reflection, the beams will end up at different places and in figure 7, for example, would miss the element 650. Similarly, in Figures 8 and 9 of Bouevitch, if the mirror 810 or 910 is a holographic mirror having reflection properties different from a conventional mirror, the reflected beam would miss element 850 or 950. In any of the examples described above, the reflected beam would miss the element performing the chromatic compensation and the system would be inoperable.

Consider, for example, the case where the replacement holographic mirror in Figure 8 of Bouevitch has the reflection properties as the holographic mirrors in Figures 1 to 4 of the present application, which is shown in figure A1 in the appendix. Referring to Figure A1, it can be seen that light (electromagnetic radiation) incident from source 805 is reflected back to the source 805 and skips the diffraction grating 820 and the chromatic dispersion compensating etalon 850. Therefore, such a system would be inoperable as a chromatic dispersion compensation system.

If the references when combined would render the prior art invention being modified unsatisfactory for its intended purpose, there is no motivation to combine the references. *McGinley v. Franklin Sports, Inc.*, 262 F.3d at 1354; *In re Gordon*, 733 F.2d at 902. Therefore, there is no motivation to modify Bouevitch by replacing conventional mirrors with holographic mirrors.

"To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or this this to this suggest all the claim limitations." (MPEP 2143)

Since there is no motivation to replace the conventional mirrors with holographic mirrors having reflection properties different from a conventional mirror and Bouevitch does not teach or suggest the use of holographic mirrors having reflection properties different from a conventional mirror, Applicant asserts that a *prima facie* case of obviousness has not been established and that claims 1, 3-13, 18 and 21 are patentable over Bouevitch.

Claims 14-17 and 19-20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Bouevitch (U.S. Patent Publication No. US2003/0021526) in view of Shirasaki et al. (U.S. Patent Publication No. US2002/0114090).

As stated above, Bouevitch does not disclose a holographic mirror having reflection properties different from a conventional mirror. Shirasaki et al. do not disclose a holographic mirror having reflection properties different from a conventional mirror.. Therefore combining Bouevitch. with Shirasaki et al. cannot be used to establish nor disclose a a holographic mirror having reflection properties different from a conventional mirror..

As stated above, replacing the conventional mirrors in Bouevitch. with holographic mirrors having reflection properties different from a conventional mirror since that replacement would render the Bouevitch invention inoperable. Combining Bouevitch with Shirasaki et al. introduces diffraction gratings but does not render the resulting system operable if the conventional mirrors in Bouevitch are replaced with holographic mirrors having reflection properties different from a conventional mirror.

Since there is no motivation to replace the conventional mirrors in Bouevitch with holographic mirrors having reflection properties different from a conventional mirror and combining Bouevitch with Shirasaki et al. does not alter that lack of motivation.

Therefore, Applicant asserts that claims 14-17, and 19- 20 are patentable over Bouevitch in view of Shirasaki et al..

In conclusion, in view of the above remarks, Applicants respectfully assert that the claims in this application are now in condition for allowance and respectfully request the Examiner to enter the amendments presented herein and find claims 1, and 3-21allowable over the prior art and pass this case to issue.

Since the total number of claims is less than the number of claims already been paid for, no additional fees are required. However, if fees are required, they should be charged to Deposit Account No. 50-1078.

In accordance with Section 714.01 of the MPEP, the following information is presented in the event that a call may be deemed desirable by the Examiner:

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Respectfully submitted,
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Dated: April 2, 2005 By: _____

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